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U.S. Fish and Wildlife Service

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In Reply Refer To:

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March 5, 1999

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Sverdrup
PHOENIX

Mr. Robert Hollis
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Region 9, Arizona Division
234 North Central Avenue, Suite 330
Phoenix, Arizona 85004

Re: Biological Opinion for State Route 260, Cottonwood through Camp Verde, Yavapai County

Dear Mr. Hollis:

This biological opinion responds to your request of September 14, 1998, for formal consultation pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended, regarding expansion of State Route 260 in Yavapai County, Arizona. The species of concern are the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and endangered razorback sucker (*Xyrauchen texanus*). The consultation period began on June 30, 1998, the date your Biological Assessment was received in our office, as agreed upon in our August 24, 1998, meeting.

It is the U.S. Fish and Wildlife Service's (Service) biological opinion that the proposed action, as described below, is not likely to jeopardize the continued existence of the southwestern willow flycatcher or razorback sucker and is not likely to adversely modify the critical habitats of southwestern willow flycatcher or razorback sucker.

The following biological opinion is based on information provided in the June 29, 1998, Biological Assessment (BA), September 14, 1998, letter that amends the BA, data in our files, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or other subjects considered in this opinion. A complete administrative record of this consultation is on file in this office.

CONSULTATION HISTORY

On November 24, 1995, the Service was asked to provide a list of threatened and endangered species to Southwestern Field Biologists. Southwestern Field Biologists was retained by Sverdrup Civil, Inc. to conduct biological surveys for the proposed highway 260 road improvement project between Cottonwood and Camp Verde, and the bridge construction over the Verde River near Camp Verde,

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Arizona. On November 29, 1995, the Service provided a list of listed species that may occur in the project area.

On March 2, 1998, the Service met with representatives from Arizona Department of Transportation (ADOT) and Sverdrup (ADOT's consultant) to discuss this project. On April 13, 1998, the Service received the Draft Environmental Assessment for State Route 260, Cottonwood to Camp Verde. In the cover letter, dated April 10, 1998, Sverdrup asked for written comments and informed the Service of a public hearing for the project being held on April 29, 1998.

On May 6, 1998, the Service met with representatives from Federal Highways Administration (FHWA), ADOT, and Sverdrup to further discuss the project. On June 30, 1998, the Service received a draft Biological Assessment entitled "State Route 260 Camp Verde to SR 87," prepared by Sverdrup for FHWA and ADOT. In the cover letter, dated June 29, 1998, FHWA requested continuation of informal consultation and concurrence for this project.

On August 24, 1998, the Service, FHWA, ADOT, and Sverdrup met again. During this meeting, several changes to the BA were discussed and agreed upon. These changes were documented in a letter written to the Service by FHWA on September 14 (received September 15). This letter also requested the Service initiate formal consultation. The Service acknowledged receipt of the formal initiation, by letter, on October 1, 1998. A concurrence with FHWA's not likely to adversely affect determination for loach minnows (*Tiaroga cobitis*) was provided in that letter. On January 6, 1999, the Service met with FHWA, ADOT, and Sverdrup for clarification of certain conservation actions undertaken as part of the proposed project. Subsequent to that meeting, a draft biological opinion was provided to FHWA, ADOT, and Sverdrup for comment.

The Service would like to acknowledge FHWA and ADOT's efforts and cooperative approach to this complex project and concern for the listed species involved. This approach has contributed to an efficient consultation process. It also minimized effects to listed species as well as provided protection and monitoring for occupied southwestern willow flycatcher habitat in the Verde Valley.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The proposed project is the widening of State Route 260 from Cottonwood to east of Camp Verde. The expansion will provide the capacity needed to accommodate the 2015 design year projected traffic volumes, and provide an adequate level of transportation service along the route over the next twenty years. Route 260 serves as the main commercial route between I-17 and the City of Cottonwood to the west and the Town of Camp Verde to the east. This roadway also serves as the primary route to recreational opportunities in the greater Verde Valley area and the Mogollon Rim.

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The BA stated that the length of the project included milepost (MP) 208.7 to 288.0. The letter of September 14, 1998, redefined the area considered in this consultation to extend from MP 208.7 east to the abandoned Forest Service airstrip. This was agreed upon in the August 24, 1998, meeting. When the area east from the airstrip to MP 228.0, including West Clear Creek bridge, is programmed for design, FHWA will initiate consultation for that project.

The proposed action varies over the different segments of highway. The following table (Table 1) is a summary of the proposed construction.

TABLE 1. Proposed action from milepost 208.7 to airstrip.	
MILEPOST	PROPOSED ACTION
208.7 to 209.1	Five-lane urban highway (two lanes traveling in each direction, separated by a continuous center turn lane)
209.1 to 212.9	Four-lane divided highway with a median of variable width
212.9 to 217.0	Four-lane divided highway with a median varying in width from 108 to 164 feet (use existing highway for eastbound traffic and construct new westbound lanes north of the existing roadway)
217.0 to 218.3	Four-lane highway with a raised median, left bay turns and frontage roads (widening occurs on the south side of existing roadway)
218.3 to 219.2	Five-lane urban highway (widening generally occurs north of existing roadway, realigns segment east of Industrial Drive)
219.2 to 221.6	Five-lane urban highway (new alignment between Finnie Flat Road and General Crook Trail)
	Three pier, four span bridge over Verde River
221.6 to airstrip	Four-lane divided highway (new westbound lanes would be constructed north of the existing roadway)

The existing bridge at the Verde River crossing consists of three piers and four spans and is 650 feet long. The design of the existing bridge (post-tensioned box girder) does not enable widening to accommodate the proposed five-lane section. An additional bridged crossing will be constructed three feet north of the existing bridge. The new bridge will have similar dimensions and construction, with three piers and four spans. A joint between the two structures will be covered by a metal plate in the middle of a 6-8 foot wide raised median.

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Although the BA included the proposed widening of the West Clear Creek bridge, this part of the project is more than 10 to 20 years out, and is not being considered as part of the proposed action within this consultation.

DESCRIPTION OF PROPOSED MITIGATION

The Service, FHWA, and ADOT have incorporated the following mitigation provisions into the proposed action for southwestern willow flycatcher and razorback sucker, based on the meeting of August 24, 1998.

Southwestern Willow Flycatcher

- 1) Once construction is completed, FHWA has agreed to enhance southwestern willow flycatcher habitat through cottonwood pole plantings adjacent to the bridge construction sites.
- 2) FHWA and ADOT have agreed to determine the ownership of the property downstream of the I-17 bridge along the Verde River on which ten flycatcher pairs successfully nested during 1997 and seven pairs in 1998. Once this information is obtained, several options will be considered to protect and/or acquire this property, including the possibility of arranging a land exchange between the property owner and the Forest Service.
- 3) FHWA and ADOT have agreed to provide funding for a two-year continuation of the ongoing southwestern willow flycatcher nest monitoring study at Camp Verde. This ongoing study has been conducted by SWCA, Inc. in conjunction with requirements of the Verde Valley Ranch Biological Opinion (July 1996). Continuation of this project for the next two years (1999 and 2000) at a cost of approximately \$90,000 per year will include the following: behavior monitoring (foraging, singing, time and activity budgets), nest monitoring, insect collection and identification (results of this will be used in conjunction with a fecal diet analysis study being funded separately), vegetation volume measurements, data entry, statistical analysis, and report writing.
- 4) FHWA and ADOT have agreed to provide funding (approximately \$15,000) for a physiological condition/health study of southwestern willow flycatchers in AZ in 1999. The proposal for this study has been written by U.S. Geological Survey, Biological Resources Division, Colorado Plateau Field Station at Northern Arizona University. The purpose of the study will be to collect blood samples to compare the physiological condition/health of flycatchers in native vegetation versus tamarisk dominated habitats. The USGS holds one of the few research permits to conduct this type of sensitive work (e.g., drawing blood).

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- 5) FHWA and ADOT have agreed to conduct southwestern willow flycatcher surveys along the Verde River within 0.5 mile upstream and 0.5 mile downstream of the bridge site during the breeding season prior to construction, and will follow accepted survey protocol. If southwestern willow flycatchers are present, there will be no construction activities in the riparian zone within 0.25 mile of the nest site. Within 0.25 mile of the nest site in non-riparian areas (e.g., roadway approaches), construction activities which would not result in additional disturbance to the birds over that of the existing road may proceed. Activities such as blasting and pile driving would be precluded. These restriction would be in place for the April 15 to September 15 breeding season. If the three-stage preconstruction survey indicates that flycatchers are not present, the contractor will be permitted to start work in riparian habitats and in the Verde River upon completion of those surveys, on or about July 1.
- 6) FHWA and ADOT have agreed that the construction contractor's work in the streambed of the Verde River will be restricted to the period of September 15 to January 30, which would follow the flycatcher breeding season and precede the main razorback sucker breeding season of February 1 to May 31.

Razorback Sucker

- 1) FHWA and ADOT have agreed that all construction work in the upland areas immediately adjacent to the Verde River will be conducted in a manner that precludes any short- or long-term sediment loading of the stream. Specific precautionary measures, such as progressive seeding, will be included in the construction contract's special provision in addition to standard best management practices (BMPs).
- 2) FHWA and ADOT have agreed that water that is needed for construction purposes (e.g., dust palliative) will not be drawn from the Verde River. ADOT has agreed to confirm that there will be ample construction water available from the Forest Service or municipal sources.
- 3) FHWA and ADOT have agreed that bridge falsework will not be permitted in the low flow channel of the Verde River at any time. During the February 1 to May 31 razorback sucker breeding season, falsework will not be permitted in any portion of the riverbed. If used outside of the breeding season, the installation and removal of bridge falsework landward of the lowflow channel will incorporate BMPs to minimize silt loading in the live stream. It is the Service's understanding that no use of, or crossing of heavy machinery will occur with the wetted channel (live stream).
- 4) FHWA and ADOT have agreed that bridge superstructure work will be permitted during the razorback sucker breeding season provided that the work is not performed in the streambeds, and the river is adequately protected from debris falling into the river from construction activities.

- 5) FHWA and ADOT have agreed that the construction contractor will provide a qualified fish monitor to determine if fish kills occur when construction activities occur in or adjacent (approximately 100 yards) to flowing water unless the activity has no potential to directly or indirectly result in a discharge into the stream. Monitoring activities will be conducted at a minimum distance of 0.5 mile upstream and 0.5 mile downstream of the construction areas in the vicinity of the Verde River bridge crossing. If fish mortality reaches more than 20 specimens per event, FWS shall be immediately notified (602/640-2720; 602/640-2730 FAX) to report the incident.

SPECIES DESCRIPTIONS AND STATUS

Southwestern Willow Flycatcher Description and Status

The southwestern willow flycatcher is a small grayish-green passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 14.6 cm (5.75 inches) in length from the tip of the bill to the tip of the tail and weighing 11 grams (0.4 ounces). It has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, the lower is light yellow grading to black at the tip. The song is a sneezy "fitz-bew" or a "fit-a-bew," the call is a repeated "whitt."

One of four currently-recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), the southwestern willow flycatcher is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

The southwestern willow flycatcher is a riparian obligate, nesting along rivers, streams, and other wetlands where dense growths of willow (*Salix* spp.), *Baccharis*, buttonbush (*Cephalanthus occidentalis*), boxelder (*Acer negundo*), saltcedar (*Tamarix* spp.) or other plants are present, often with a scattered overstory of cottonwood (*Populus fremontii*.) and/or willow. These riparian communities provide nesting, foraging, and migratory habitat for the flycatcher.

This bird is an insectivore, typically perching on a branch and making short direct flights, or sallying, to capture flying insects. Drost *et al.* (1998) found that the major prey items of the southwestern willow flycatcher, from 15 sites in Arizona and Colorado, consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera); and true bugs (Hemiptera). Other insect prey taxa included leafhoppers (Homoptera: Cicadellidae); dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey included spiders (Araneae), sowbugs (Isopoda),

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and fragments of plant material. Drost noted significant differences in dietary items based on sites and habitats.

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995). Critical habitat was designated on July 22, 1997, and a correction notice was published in the Federal Register on August 20, 1997. Eighteen critical habitat units totaling 599 river miles in Arizona, California, and New Mexico were designated. In Arizona, critical habitat was designated along portions of the San Pedro River (100 miles), Verde River (90 miles) including Tavaschi Marsh and Ister Flat, Wet Beaver Creek (20 miles), West Clear Creek (9 miles), Colorado River in the Grand Canyon (32 miles), and Little Colorado River and the West, East, and South Forks of the Little Colorado River (30 miles) (USFWS 1997).

Habitat

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to over 7000 feet in Arizona and southwestern Colorado. Throughout its wide geographic and elevational range, its riparian habitat can be broadly described based on plant species composition and habitat structure (Sogge *et al.* 1997). Two components that vary less across this subspecies' range are vegetation density and the presence of surface water. Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the southwestern willow flycatcher. Those types are described below and should be referenced with photographs provided in Sogge *et al.* (1997).

Monotypic willow: Nearly monotypic, dense stands of willow (often *Salix exigua* or *S. geyeriana*) 3 to 7 meters in height with no distinct overstory layer; usually very dense structure in at least lower 2 m; live foliage density is high from the ground to canopy.

Monotypic exotic: Nearly monotypic, dense stands of exotics such as saltcedar or Russian olive (*Elaeagnus angustifolia*) 4 to 10 meters (m) in height forming a nearly continuous, closed canopy (with no distinct canopy layer); lower 2 m may be very difficult to penetrate due to branch density; however, live foliage volume may be relatively low from 1 to 2 m above ground; canopy density uniformly high.

Native broadleaf dominated: Comprised of dense stands of single species (often Goodding's or other willows) or mixtures of native broadleaf trees and shrubs including, but not limited to, cottonwood, willows, boxelder, ash, buttonbush, and stinging nettle from 4 to 15 m in height; characterized by trees of different size classes; may have distinct overstory of cottonwood, willow or other broadleaf species, with recognizable subcanopy layers and a dense understory of mixed species; exotic/introduced species may be a rare component, particularly in understory.

Mixed native/exotic: Dense mixtures of native broadleaf trees and shrubs (such as those listed above) mixed with exotic species such as tamarisk and Russian olive; exotics are often primarily in the understory, but may also be a component of overstory; the native and exotic components may be

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dispersed throughout the habitat or concentrated as a distinct patch within a larger matrix of habitat; overall, a particular site may be dominated primarily by natives, exotics, or be a more or less equal mixture.

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests; flycatchers sometimes nest in areas where nesting substrates were in standing water (Maynard 1995, Sferra *et al.* 1995, 1997). However, hydrological conditions at a particular site can vary remarkably in the arid Southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g., creation of pilot channels), where modification of subsurface flows has occurred (e.g., agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer *et al.* 1996).

Breeding Biology

The southwestern willow flycatcher begins arriving on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Maynard 1995, Sferra *et al.* 1995, 1997). Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988a,b, Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995). Southwestern willow flycatchers typically lay three to four eggs in a clutch (range = 2-5). The breeding cycle, from laying of the first egg to fledging, is approximately 28 days. Eggs are laid at one-day intervals (Bent 1963, Walkinshaw 1966, McCabe 1991); they are incubated by the female for approximately 12 days; and young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Southwestern willow flycatchers typically raise one brood per year but have been documented raising two broods during one season (Whitfield 1990). They have also been documented reneesting after nest failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Whitfield 1994, Whitfield and Strong 1995).

Southwestern willow flycatcher nests are open cup structures, approximately 8 centimeters (cm) high and 8 cm wide (outside dimensions), exclusive of any dangling material at the bottom. Nests are typically placed in the fork of a branch with the nest cup supported by several small-diameter vertical stems. The main branch from which the fork originates may be oriented vertically, horizontally, or at an angle, and stem diameter for the main supporting branch can be as small as three to four cm. Vertical stems supporting the nest cup are typically one to two cm in diameter. Occasionally, southwestern willow flycatchers place their nests at the juncture of stems from separate plants, sometimes different plant species. Those nests are also characterized by vertically-oriented stems supporting the nest cup. Spencer *et al.* (1996) measured the distance between flycatcher nests and shrub/tree center for 38 nests in monotypic saltcedar and mixed native broadleaf/saltcedar habitats. In monotypic saltcedar stands (n=31), nest placement varied from 0.0 m (center stem of shrub or tree) to 2.5 m. In the mixed riparian habitat (n=7), nest placement varied from 0.0 to 3.3 m.

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Height of the nest varies across the southwestern willow flycatcher's range and may be correlated with the species and height of nest substrate, foliage densities, and/or overall canopy height. Southwestern willow flycatcher nests have been found as low as 0.6 m above the ground to 18 m above the ground. Flycatchers using predominantly native broadleaf riparian habitats nest relatively low to the ground (between 1.8 m and 2.1 m on average), whereas those using mixed native/exotic and monotypic exotic riparian habitats nest relatively high above the ground (between 4.3 m and 7.4 m on average).

Historic egg/nest collections and species' descriptions from throughout the southwestern willow flycatcher's range confirm the bird's widespread use of willow for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987, T. Huels *in litt.* 1993, San Diego Natural History Museum 1995). Currently, southwestern willow flycatchers use a wide variety of plant species for nesting substrates primarily including Geyer willow, Goodding's willow, boxelder, saltcedar, Russian olive and live oak. Other plant species that southwestern willow flycatcher nests have been documented in include: buttonbush, black twinberry (*Lonicera involucrata*), Fremont cottonwood, white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), Russian olive, and *S. hindsiana*.

Brood parasitism of southwestern willow flycatcher nests by the brown-headed cowbird (*Molothrus ater*) has been documented throughout the flycatcher's range (Brown 1988a,b, Whitfield 1990, Muiznieks *et al.* 1994, Whitfield 1994, Hull and Parker 1995, Maynard 1995, Sferra *et al.* 1995, Sogge 1995b). Cowbirds lay their eggs in the nests of other species directly affecting their hosts by reducing nest success. Cowbird parasitism reduces host nest success in several ways. Cowbirds may remove some of the host's eggs, reducing overall fecundity. Hosts may abandon parasitized nests and attempt to renest, which can result in reduced clutch sizes, delayed fledging, and reduced overall nesting success and fledgling survivorship (Whitfield 1994, Whitfield and Strong 1995). Cowbird eggs, which require a shorter incubation period than those of many passerine hosts, hatch earlier giving cowbird nestlings a competitive advantage over the host's young for parental care (Bent 1963, McGeen 1972, Mayfield 1977a,b, Brittingham and Temple 1983). Where studied, high rates of cowbird parasitism have coincided with southwestern willow flycatcher population declines (Whitfield 1994, Sogge 1995a, Sogge 1995c, Whitfield and Strong 1995), or, at a minimum, resulted in reduced or complete elimination of nesting success (Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995, Sferra *et al.* 1995, Sogge 1995a, Sogge 1995c, Whitfield and Strong 1995). Whitfield and Strong (1995) found that flycatcher nestlings fledged after July 20th had a significantly lower return rate and that cowbird parasitism was often the cause of delayed fledging.

Territory size

Southwestern willow flycatcher territory size, as defined by song locations of territorial birds, probably changes with population density, habitat quality, and nesting stage. Estimated territory sizes are 0.24-1.3 ha for monogamous males and 1.1-2.3 ha for polygynous males at the Kern River (Whitfield and Enos 1996), 0.06-2 ha for bird in a 0.6-0.9 ha patches on the Colorado River (Sogge *et al.* 1995c) and 0.2-0.5 ha in a 1.5 ha patch on the Verde River (Sogge 1995a).

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Rangewide Distribution and Abundance -

Unitt (1987) documented the loss of more than 70 breeding locations rangewide, including locations along the periphery and within core drainages that form this subspecies range. Unitt estimated that the rangewide population probably was comprised of 500 to 1000 pairs. The current known population of southwestern willow flycatchers stands at approximately 587 territories (Table 2). Breeding occurs at approximately 75 sites (Sogge *et al.* 1997).

The data presented in Table 2 represents both a summary of current survey data as well as a composite of surveys conducted since 1992. Locations that had southwestern willow flycatchers for only one year were tabulated as if the location is still extant. Given that extirpation has been documented at several locations during the survey period, this method of analysis introduces a bias that may overestimate the number of breeding groups and overall population size. In addition, females have been documented singing. Because the established survey method relies on singing birds as the entity defining a territory (Tibbitts *et al.* 1994), double-counting may be another source of sampling error that biases population estimates upward. The figure of 587 southwestern willow flycatcher territories is a preliminary rangewide estimate for 1997 and is an approximation based on considerable survey effort, both extensive and intensive. Given sampling errors that may bias population estimates positively or negatively (e.g., incomplete survey effort, double-counting males/females, composite tabulation methodology), natural population fluctuation, and random events, it is likely that the total breeding population of southwestern willow flycatchers fluctuates between 350 and 550 pairs. A substantial proportion of individuals appear to remain unmated. At such low population levels, random demographic, environmental, and/or genetic events could lead to loss of breeding groups and the continued decline of the species. The high proportion of unmated individuals documented during recent survey efforts suggests the southwestern willow flycatcher may already be subject to a combination of these factors (e.g., uneven sex ratios, low probability of finding mates in a highly fragmented landscape).

The results shown in Table 2 demonstrates the imperiled population status of the flycatcher. More than 75% of the locations where flycatchers have been found are comprised of 5 or fewer territorial birds. Approximately 20% of the locations are comprised of single, unmated individuals. The distribution of breeding groups is highly fragmented, with groups often separated by considerable distances (e.g., approximately 88 kilometer straight-line distance between breeding flycatchers at Roosevelt Lake, Gila Co., Arizona, and the next closest breeding groups known on either the San Pedro River (Pinal Co.) or Verde River (Yavapai Co.). Continued survey efforts may discover additional small breeding groups. To date, survey results reveal a consistent pattern rangewide—the southwestern willow flycatcher population as a whole is comprised of extremely small, widely-separated breeding groups including unmated individuals.

Declining numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (*Molothrus ater*) (McCarthy *et al.* 1998, Sogge *et al.* 1997). Habitat loss and degradation is caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and

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Table 2. Rangewide population status for the southwestern willow flycatcher based on 1996 survey data for New Mexico and California, and 1997 survey data for Arizona, Colorado, Nevada and Utah. Composite data indicated by () represents multi-year survey data for 1993-1996 for New Mexico and California and 1993-1997 for Arizona, Colorado, Nevada and Utah¹.

State	No. of Sites with Territories (Composite No. of Sites)	No of Drainages with Territories (Composite No. of Drainages)	No. of Sites (Composite) with Territories			
			with ≤5	with 6-20	with >20	Total No. of Territories (Composite)
Arizona	41 (65)	12 (12)	33 (53)	8 (9)	1 (3)	190 (287)
California	11 (23)	8 (14)	7 (17)	2 (4)	2 (2)	91 (130)
Colorado	7 (15)	6 (11)	2 (10)	4 (4)	1 (1)	69 (92)
New Mexico	19 (30)	6 (8)	16 (26)	3 (3)	1 (1)	209 (232)
Nevada	5 (6)	3 (3)	4 (5)	1 (1)	0 (0)	20 (23)
Utah	5 (10)	4 (7)	5 (10)	0 (0)	0 (0)	8 (16)
Texas	?	?	?	?	?	?
Total	88 (149)	39 (55)	67 (121)	18 (21)	5 (7)	587 (780)

¹ Based on surveys conducted at >800 historic and new sites in AZ (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Sogge and Tibbitts 1994, Sferri *et al.* 1995, 1997, Sogge 1995a, Sogge *et al.* 1995, Spencer *et al.* 1996, McKernan 1997, McKernan and Braden 1998, McCarthy *et al.* 1998); CA (Camp Pendleton 1994, Whitfield 1994, Griffith and Griffith 1995, Holmgren and Collins 1995, Kus 1995, San Diego Natural History Museum 1995, Whitfield and Strong 1995, Griffith and Griffith 1996); CO (T. Ireland 1994 *in litt.*, Stransky 1995); NM (Maynard 1995, Cooper 1996, 1997, Parker 1997, Skaggs 1996, Williams 1995); NV (C. Tomlinson 1995 *in litt.*, 1997); UT (McDonald *et al.* 1995, 1997, Sogge 1995b). Systematic surveys have not been conducted in Texas. For sites surveyed multiple years, highest single-year estimate of territories was used to tabulate status data. Tabulations do not include documented extirpations within survey period. Thus, individual state estimates and rangewide totals may be biased upward.

groundwater pumping, channelization, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996). Fire frequency in riparian vegetation increases with dominance by saltcedar (DeLoach 1991), and water diversions or groundwater pumping that results in dessication of riparian vegetation (Sogge *et al.* 1997). The presence of livestock and range improvements such as waters and corrals; agriculture; urban areas such as golf courses, bird feeders,

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and trash areas may provide feeding sites for cowbirds. These feeding areas coupled with habitat fragmentation, facilitate cowbird parasitism of flycatcher nests (Tibbitts *et al.* 1994, Hanna 1928, Mayfield 1977).

Arizona Distribution and Abundance

Unit (1987) concluded that "Probably the steepest decline in the population level of *E. t. extimus* has occurred in Arizona..." Historic records for Arizona indicate the former range of the southwestern willow flycatcher included portions of all major river systems (Colorado, Salt, Verde, Gila, Santa Cruz, and San Pedro) and major tributaries, such as the Little Colorado River and headwaters, and White River.

As of 1997, 190 territories were known from 41 sites along 12 drainages statewide (Table 2). The majority of breeding groups in Arizona are extremely small; of the 41 sites where flycatchers have been documented, 80% (33) contain 5 or fewer territorial flycatchers. Moreover, 15% to 18% of all sites in Arizona are comprised of single, unmated territorial birds.

As reported by McCarthy *et al.* (1998), the greatest concentrations of willow flycatchers in Arizona in 1997 were near the confluence of the Gila and San Pedro Rivers (146 flycatchers, 76 territories); at the inflows of Roosevelt Lake (74 flycatchers, 39 territories); between Fort Thomas and Solomon on the middle Gila River (32 flycatchers, 18 territories); Topock Marsh on the Lower Colorado River (24 flycatchers, 12 territories); Verde River at Camp Verde (20 flycatchers, 10, territories); Alpine/Greer on the San Francisco River/Little Colorado River (16 flycatchers, 9 territories); and Alamo Lake on the Bill Williams River (includes Santa Maria and Big Sandy River sites) (16 flycatchers, 10 territories). The lowest elevation where territorial pairs were detected was 60 m at Adobe Lake on the Lower Colorado River. Nesting flycatchers were observed as low as 140 m at Topock Marsh and as high as 2530 m at the Greer town site.

In 1997, nest success or failure was documented at 131 of the 171 nesting attempts at 28 sites in Arizona. Of the 135 nests, an estimated 160 flycatchers fledged. The nest failure rate was 48%. Causes of nest failure included predation (29%), brood parasitism (8%), nest abandonment (7%), and unknown causes (3%) (McCarthy *et al.* 1998). Thirty-one percent of all parasitized nests were subsequently abandoned. One nest in Camp Verde, was parasitized, but successfully fledged at least one willow flycatcher. It is important to note that cowbird trapping programs occurred at seven of the monitored nest sites.

Table 3 lists all Federal agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide since listing in 1995. As indicated in the table, many activities continue to adversely affect the distribution and extent of occupied and potential breeding habitat throughout Arizona. Stochastic events also continue to adversely affect the distribution and extent of occupied and potential breeding habitat. A catastrophic fire in June of 1996, destroyed approximately one km of occupied habitat on the San Pedro River in Pinal County. That fire resulted in the forced dispersal or loss of up to 8 pairs of flycatchers (Paxton *et al.* 1996).

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Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency ¹	Incidental Take Anticipated
Arizona			
Cedar Bench Allotment (Yavapai)	1995	Tonto NF	Indeterminable
Tuzigoot Bridge (Yavapai)	1995*	NPS	None
Windmill Allotment (Yavapai)	1995	Coconino NF	Loss of 1 nest annually/for 2 years
Solomon Bridge (Graham)	1995	FHWA	Loss of 2 territories
Tonto Creek Riparian Unit (Maricopa)	1995	Tonto NF	Indeterminable
Eastern Roosevelt Lake Watershed Allotment (Maricopa)	1995	Tonto NF	Indeterminable
Cienega Creek (Pima)	1996	BLM	1 nest annually by cowbird parasitism
Glen Canyon Spike Flow (Coconino)	1996	USBR	Indeterminable
Verde Valley Ranch (Yavapai)	1996*	Corps	Loss of 2 flycatcher territories
Modified Roosevelt Dam (Gila/Maricopa)	1996*	USBR	Loss of 45 territories; reduced productivity/ survivorship 90 birds
Lower Colorado River Operations (Mohave/Yuma)	1997*	USBR	Indeterminable
Blue River Road (Greenlee)	1997	A/S NF	Indeterminable
Skeleton Ridge (Yavapai)	1997	Tonto NF	Indeterminable
White Canyon Fire - Emergency Consultation (Pinal)	1997	Bureau	Harassment of 4 pairs
U.S. Hwy 93 Wickenburg (Mohave/Yavapai)	1997	FHWA	Harassment of 6 birds in 3 territories and 1 bird killed/decade
Safford District Grazing Allotments (Greenlee, Graham, Pinal, Cochise & Pima)	1997	Bureau	Indeterminable
Lower Gila Resource Plan Amend. (Maricopa, Yavapai, Pima, Pinal, La Paz & Yuma)	1997	Bureau	Indeterminable
Storm Water Permit for Verde Valley Ranch (Yavapai)	1997	EPA	Indeterminable
Gila River Transmission Structures (Graham)	1997	AZ Electric Power Coop. Inc.	Indeterminable
Arizona Strip Resource Mgmt Plan Amendment (Mohave)	1998	Bureau	Harm of 1 nest every 3 years

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Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency ¹	Incidental Take Anticipated
CAP Water Transfer Cottonwood/Camp Verde (Yavapai/Maricopa)	1998	USBR	Indeterminable
Cienega Creek Stream Restoration Project (Pima)	1998	Bureau	Harassment of 1 bird
Kearny Wastewater Treatment (Pinal)	1998	FEMA	Indeterminable
Fort Huachuca Programmatic (Cochise)	1998	US Army	in consultation
SR 260 Expansion (Yavapai)	1998	FHWA	in consultation
Mingus Avenue Extension (Yavapai)	1998	Corps	in consultation
Wildlife Services (ADC) Nationwide consultation	1998	Wildlife Services	in consultation
Alamo Lake Reoperation (LaPaz, Mohave)	1998	Corps	in consultation
California			
Prado Basin (Riverside/San Bernardino)	1994	Corps	None
Orange County Water District (Orange)	1995	Corps	None
Temescal Wash Bridge (Riverside)	1995	Corps	Harm to 2 flycatchers
Camp Pendleton (San Diego)	1995	DOD	Loss of 4 flycatcher territories
Lake Isabella Operations 1996 (Kern)	1996	Corps	Inundation 700 ac critical habitat; reduced productivity 14 pairs
Lake Isabella Long-Term Operations (Kern)	1997	Corps	Indeterminable
Nevada			
Gold Properties Resort (Clark)	1995	BIA	Harm to 1 flycatcher from habitat loss
Las Vegas Wash, Pabco Road Erosion Control Structure	1998	Corps	Harm to 2-3 pairs of flycatchers
New Mexico			
Corrales Unit, Rio Grande (Bernalillo)	1995	Corps	None
Rio Puerco Resource Area	1997	Bureau	None
Farmington District Resource Management Plan	1997*	Bureau	None
Mimbres Resource Area Management Plan	1997*	Bureau	2 pairs of flycatchers
Taos Resource Area	1997*	BLM	1 pair of flycatchers
Caballo Resource Area	1997	BLM	None

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Table 3. Agency actions that have undergone section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.			
Action (County)	Year	Federal Agency ¹	Incidental Take Anticipated
San Acacia Flood Control Project	1997	Corps	Consultation in progress
German Air Force Operations at Holloman	1998	USAF	None
Belen Unit, Rio Grande (Valencia)	1998	Corps	Consultation in progress
Middle Rio Grande Water Operations	1998	BR/Corps	Consultation in progress
Gila River Bank Stabilization	1998	Corps	Consultation in progress
BIA = Bureau of Indian Affairs; Bureau = Bureau of Land Management; Corps = Army Corps of Engineers; DOD = Dept. of Defense; EPA = Environmental Protection Agency; FEMA = Federal Emergency Management Agency; FHWA = Federal Highway Administration; NF = National Forest; NPS = National Park Service; USBR = U.S. Bureau of Reclamation; USFS = U.S. Forest Service.			
¹ Jeopardy opinions.			

Reproductive Success

Intensive nest monitoring efforts in California, Arizona, and New Mexico have revealed that: (1) sites with both relatively large and small numbers of pairs have experienced extremely high rates of brood parasitism; (2) high levels of cowbird parasitism in combination with nest loss due to predation have resulted in low reproductive success and, in some cases, population declines; (3) at some sites, the level of cowbird parasitism remains high across years, while at others parasitism varies temporally with cowbirds absent in some years; (4) the probability of a southwestern willow flycatcher successfully fledging its own young from a nest that has been parasitized by cowbirds is low (i.e., <5%); (5) cowbird parasitism and/or nest loss due to predation often result in reduced fecundity in subsequent nesting attempts, delayed fledging, and reduced survivorship of late-fledged young, and; (6) nest loss due to predation appears fairly consistent from year to year and across sites, generally in the range of 30 to 50%.

Nest loss due to predation is common among small passerine birds. The rates documented for southwestern willow flycatchers are also typical for small passerine (i.e., rates < 50%). However, even at these "typical" levels, nest loss due to predation is a significant factor contributing to low reproductive success. Especially in a depressed population, nest predation presents a difficult management challenge because of the variety of predators. Documented predators of southwestern willow flycatcher nests identified to date include common king snake (*Lampropeltis getulus*) and Coopers hawk (*Accipiter cooperii*) (McCarthy *et al.* 1998, Paxton *et al.* 1997). Efforts to reduce predation may include restricting activities in flycatcher habitat that attract predators, such as camping, picnicking, etc. where pets are loose and refuse is concentrated.

The data presented above and in Table 4 demonstrate that cowbird parasitism and nest depredation are affecting southwestern willow flycatchers throughout their range. Cowbirds have been documented at more than 90% of sites surveyed (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Camp

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Table 4. Nest predation and brood parasitism rates documented for the southwestern willow flycatcher across its range ¹ .					
Location	Pre-1993	1993	1994	1995	1996
S. Fork Kern River (Kern Co., CA)					
% nests parasitized ²	50 - 80	38*	16*	19*	11*
% nests depredated	33 - 42	37	47	34	28
San Luis Rey River (San Diego Co. CA)					
% nests parasitized	-	-	0*	0*	?
% nests depredated	-	-	28	5	?
Colorado River (Coconino Co., AZ)					
% nests parasitized	≥ 50	100	44	100	0
% nests depredated	-	30	78	0	0
Verde River (Yavapai Co., AZ)					
% nests parasitized	-	100	50	extirpated	extirpated
% nests depredated	-	100	50		
Little Colorado River (Apache Co., AZ)					
% nests parasitized	-	-	22	0	57
% nests depredated	-	-	33	28	14
Rio Grande (Socorro Co., NM)					
% nests parasitized	-	-	20	66	?
% nests depredated	-	-	40	60	?
Gila River (Grant Co., NM)					
% nests parasitized	-	-	-	16-27	?
% nests depredated	-	-	-	45	?
¹ Sources: Sogge and Tibbitts (1992), Sogge <i>et al.</i> (1993), Brown (1994), Maynard 1994, Muiznieks <i>et al.</i> (1994), Sogge and Tibbitts (1994), Cooper (1996, 1997), Sferra <i>et al.</i> (1997), Skaggs (1995), Sogge (1995a), Sogge <i>et al.</i> (1995), Parker (1997), Peterson and Sogge (1996), Spencer <i>et al.</i> (1996), Whitfield and Strong (1995), Whitfield and Enos (1996). ² Proportion of nests containing at least one brown-headed cowbird egg. * Brown-headed cowbird control program implemented.					

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Pendleton 1994, Muiznieks *et al.* 1994, Sogge and Tibbitts 1994, T. Ireland 1994 *in litt.*, Whitfield 1994, C. Tomlinson 1995 *in litt.*, Griffith and Griffith 1995, Holmgren and Collins 1995, Kus 1995, Maynard 1995, McDonald *et al.* 1995, Sferra *et al.* 1995, Sogge 1995, 1996, San Diego Natural History Museum 1995, Stransky 1995, Whitfield and Strong 1995, Griffith and Griffith 1996, Skaggs 1995, Spencer *et al.* 1996, Whitfield and Enos 1996, Sferra *et al.* 1997, McCarthy *et al.* 1998). Thus, the potential for cowbirds to be a persistent and widespread threat remains high. Cowbird trapping has been demonstrated to be an effective management strategy for increasing reproductive success for the southwestern willow flycatcher as well as for other endangered Passerines (e.g., least Bell's vireo [*Vireo bellii pusillus*], black-capped vireo [*V. auricapillus*], golden-cheeked warbler [*Dendroica chrysoparia*]). It may also benefit juvenile survivorship by increasing the probability that parents fledge birds early in the season. Expansion of cowbird management programs has the potential to not only increase reproductive output and juvenile survivorship at source populations, but also to potentially convert small, sink populations into breeding groups that contribute to population growth and expansion.

Razorback Sucker Description and Status

Listing History

The razorback sucker was first proposed for listing under the Act on April 24, 1978, as a threatened species. The proposed rule was withdrawn on May 27, 1980 due to changes to the listing process included in the 1978 amendments to the Act; the amendments required all listings to be completed within two years of publication of the proposed rule and that deadline was not met. The 1978 amendments also required that critical habitat be included in the listing of most species; however, no critical habitat package was developed for the proposed listing of the species.

In March 1989, the Service was petitioned by a consortium of environmental groups to list the razorback sucker as an endangered species. The Service made a positive finding on the petition in June, 1989, that was published in the Federal Register on August 15, 1989. The finding stated that a status review was in progress and provided for submission of additional information through December 15, 1989. The proposed rule to list the species as endangered was published on May 22, 1990, and the final rule was published on October 23, 1991. The effective date of the rule was November 22, 1991. Critical habitat was designated in 1994 and is discussed elsewhere in this section.

Species Description

The razorback sucker is the only representative of the genus *Xyrauchen* and was described from specimens taken from the "Colorado and New Rivers" (Abbott 1861) and Gila River (Kirsch 1889) in Arizona. This native sucker is distinguished from all others by the sharp edged, bony keel that rises abruptly behind the head. The body is robust with a short and deep caudal peduncle (Bestgen 1990). The razorback sucker may reach lengths of one meter and weigh five to six kilograms (Minckley 1973). Adult fish in Lake Mohave reach about half this maximum size and weight (Minckley 1983). Razorback suckers are long-lived fish, reaching the age of at least the mid-40's (McCarthy and Minckley 1987).

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Life History and Habitat

Life history information for the razorback sucker was recently summarized in the status review for the species (Bestgen 1990), in *Battle Against Extinction: Native Fish Management in the American West* (Minckley and Deacon 1991), and in the biological support document for critical habitat designation (USFWS 1993). The life history information presented in this biological opinion is primarily taken from these sources and is only a brief summary of the available information. For additional information, please consult these referenced documents or the other available literature.

Adult razorback suckers utilize most of the available riverine habitats, although there may be an avoidance of whitewater type habitats. Main channel habitats used tend to be low velocity ones such as pools, eddies, nearshore runs, and channels associated with sand or gravel bars (summarized in Bestgen 1990). Backwaters, oxbows, and sloughs were well-used habitat areas adjacent to the main channel; flooded bottomlands are important in the spring and early summer (summarized in Bestgen 1990). Razorback suckers may be somewhat sedentary, however considerable movement over a year has been noted in several studies (USFWS 1993). Spawning migrations have been observed or inferred in several locales (Jordan 1891, Minckley 1973, Osmundson and Kaeding 1989, Bestgen 1990, Tyus and Karp 1990).

Spawning takes place in the late winter to early summer depending upon local water temperatures. Various studies have presented a range of water temperatures at which spawning occurs. In general, temperatures between 10° to 20° C are appropriate (summarized in Bestgen 1990). Spawning areas included gravel bars or rocky runs in the main channel (Tyus and Karp 1990), and flooded bottomlands (Osmundson and Kaeding 1989). There is an increased use of higher velocity waters in the spring, although this is countered by the movements into the warmer, shallower backwaters and inundated bottomlands in early summer (McAda and Wydoski 1980, Tyus and Karp 1989, Osmundson and Kaeding 1989).

Habitat needs of larval razorback suckers are not well known. Warm, shallow water appears to be important. Shallow shorelines, backwaters, inundated bottomlands and similar areas have been identified (Sigler and Miller 1963, Marsh and Minckley 1989, Tyus and Karp 1989, 1990, Minckley et al. 1991). For the first period of life, larval razorbacks are nocturnal and hide during the day. Diet during this period is mostly plankton (Marsh and Langhorst 1988, Papoulias 1988). Young fish grow fairly quickly with growth slowing once adult size is reached (McCarthy and Minckley 1987). Little is known of juvenile habitat preferences.

Population Dynamics

The razorback sucker is adapted to the widely fluctuating physical environment of the historic Colorado River. Adults can live 45-50 years, and once reaching maturity between two and seven years of age (Minckley 1983), apparently produce viable gametes even when quite old. The ability of razorback suckers to spawn in a variety of habitats, flows and over a long season are also survival adaptations. In the event of several consecutive years with little or no recruitment (due to either too much or too little water), the demographics of the population as a whole might shift, but future

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reproduction would not be compromised. Given the vagaries of the Colorado River, successful recruitment likely varied tremendously from year to year even without catastrophic flood or drought. Average fecundity recorded in studies ranged from 46,740 to 100,800 eggs per female (Bestgen 1990). With a varying age of maturity and the fecundity of the species, it would be possible to quickly repopulate after a catastrophic loss of adults.

Rangewide Present Status

The razorback sucker was once abundant in the Colorado River and its major tributaries throughout the Basin, occupying 3,500 miles of river in the United States and Mexico (USFWS 1993). Records from the late 1800's and early 1900's indicated the species was abundant in the lower Colorado and Gila River drainages (Kirsch 1889, Gilbert and Scofield 1898, Minckley 1983, Bestgen 1990).

The razorback sucker was listed as an endangered species due to declining or extirpated populations throughout the range of the species. The causes of these declines are changes to biological and physical features of the habitat. The effects of these changes have been most clearly noted by the almost complete lack of natural recruitment to any population in the historic range of the species. Populations are generally small and composed of aging individuals. Recovery efforts under the Recovery Implementation Program in the Upper Basin have begun, but significant recovery results have not been achieved for this species. In the Lower Basin, efforts to reintroduce the species in the Gila, Salt and Verde Rivers have not been successful in establishing self-sustaining populations. Reintroduction efforts are currently ongoing only in the Verde River. Augmentation efforts along the lower Colorado River propose to replace the aging populations in Lakes Havasu and Mohave with young fish from isolated grow-out facilities. This may prevent the imminent extinction of the species in the wild, but does not appear capable of ensuring long term survival or recovery. Overall, the status of the razorback sucker continues to decline.

Critical Habitat

Critical habitat is defined in the Act to include areas whether occupied or not that are essential to the conservation of the species. Conservation is defined in the Act as that needed to bring about the complete recovery of the species. Efforts to designate critical habitat began with the proposed rule to list the razorback sucker in 1990.

The May 22, 1990, proposed rule did not contain a proposal to designate critical habitat. The final rule listing the razorback sucker as an endangered species stated that critical habitat was not determinable at the time of listing. This gave the Service an additional year to obtain further habitat information. On October 30, 1991, the Service received a notice of intent to sue from the Sierra Club Legal Defense Fund over failure to designate critical habitat at the time of listing. After review of additional information available, the Service concluded on December 6, 1991, that designation of critical habitat was both determinable and prudent. After a ruling that the Service had violated the Act by not designating critical habitat with the listing of the species, the U.S. District Court in

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Denver, Colorado, ordered the Service to publish a proposed rule to designate critical habitat within 90 days of the Court's order.

The Service determined that since the habitats of the razorback sucker overlapped with those of the bonytail chub (*Gila elegans*), Colorado squawfish (*Ptychocheilus lucius*) and humpback chub (*Gila cypha*), and the issues facing these species were very similar, that designating critical habitat for all four species would be appropriate. The final rule to designate critical habitat for the four listed native Colorado River fish was published on March 21, 1994. Critical habitat for the razorback sucker includes portions of the Colorado, Duchesne, Green, Gunnison, San Juan, White and Yampa Rivers in the Upper Basin and the Colorado, Gila, Salt and Verde Rivers in the Lower Basin. All critical habitat reaches were considered to be occupied at the time of designation.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Southwestern Willow Flycatcher Environmental Baseline and Status in the Action Area

Approximately ninety miles of the Verde River from Sob Canyon to its inflow at Horseshoe Reservoir, including Tavasci Marsh and Ister Flat, is designated as critical habitat for the southwestern willow flycatcher. The lateral extent of designated critical habitat is within 100 meters of the edge of areas with surface water during the May to September breeding season and within 100 meters of areas where such surface water no longer exists owing to habitat degradation but may be recovered with habitat rehabilitation. This includes areas with thickets, riparian trees and shrubs, and areas where such riparian vegetation does not currently exist, but may become established with natural regeneration or habitat rehabilitation.

The Verde River Valley between the towns of Cottonwood and Camp Verde is characterized by a wide flood basin once dominated by Fremont cottonwoods, although cottonwood stands are now highly fragmented (Paxton *et al.* 1997). A total of 56 sites have been surveyed for flycatchers in the Verde River system since 1993 (Sferra *et al.* 1997, McCarthy *et al.* 1998). A total of four willow flycatcher breeding sites have been documented along the Verde River through the Verde Valley: Tuzigoot Bridge, Tavasci Marsh, Camp Verde, and Rancho Rio Verde. The Tuzigoot Bridge site consists primarily of Fremont cottonwood, Gooding willow, tamarisk, box elder and honey mesquite. This was an active breeding site from 1992 to 1995, with two to four territorial male flycatchers (Sogge 1995a). However, since then only a single flycatcher, detected in 1996, has been documented.

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The Tavasci Marsh site is a grove of mature Goodding willows (about 15 m high) in which flycatchers nested. The site is in a marshy area about 200 m away from the Verde River at an elevation of 1006 m. In 1996, four flycatchers were detected (2 territories, 2 pairs), however, none were detected in 1997. The mature willow trees have been heavily girdled by beavers which may have compromised the site (Paxton and Sogge 1996).

The largest flycatcher breeding site along the Verde River, the Camp Verde site, (elevation 942 m) is a mature Fremont cottonwood and Goodding willow gallery forest with adjacent patches of dense tamarisk. With several exceptions, the flycatchers nested in the dense tamarisk patches, although they would sing and perch in native trees (Paxton *et al.* 1997). In 1997, twenty flycatchers were detected (10 territories, 10 pairs) at the Camp Verde site. Of the nineteen nesting attempts during 1997, there was 58% nest success, with 22 young fledged. Also at this site, 5% of nests were abandoned, 21% of nests were predated, and 16% of nests were parasitized by brown-headed cowbirds (McCarthy *et al.* 1997). In 1997, five flycatchers (71%) returned to their 1996 breeding site, and one flycatcher banded at Tuzigoot Bridge defended a territory at Camp Verde (Paxton *et al.* 1997). In 1998, seven pairs (13 birds, including one polygenous male) nested at this site (Tracy McCarthy, AGFD, pers. comm.). The proposed project bridge site is approximately four miles downstream of the occupied Camp Verde flycatcher site.

In 1998, confirmed nesting of willow flycatchers was documented at the Ranch Rio Verde site. This was the first time flycatchers have been found at this site, which was last surveyed in 1996.

Flycatchers have also been detected at three other sites along the Verde River: Mescal Gulch, Ister Flat, and Sheepshead, however, no nests were documented at any of these sites. Mescal Gulch had a single flycatcher detected in 1993. At the Ister Flat site, a single flycatcher was detected in 1993. Flycatchers were not detected again at Ister Flat until 1997, when three flycatchers were detected (2 territories, 1 pair) and again in 1998, when two flycatchers were detected. Sheepshead had a single flycatcher detected in 1998.

Razorback Sucker Environmental Baseline and Status in the Action Area

Within the project area, designated critical habitat includes the Verde River and its 100-year floodplain, which extends along the Verde River from just below Perkinsville to Horseshoe Dam. Razorback sucker was historically found in the Verde River at least as far upstream as Perkinsville (Minckley and Alger 1968). Due to habitat alterations and losses and the introduction and spread of nonnative species, razorback sucker was extirpated from the Verde River, with the last record at Peck's Lake in 1954 (Wagner 1954, Minckley 1973). Beginning in 1981, razorback sucker was reintroduced into the Verde River using hatchery stock originating from Lake Mohave (Hendrickson 1993). Predation by nonnative species was thought to be a major cause of stocked fish loss (Minckley 1983, Marsh and Brooks 1989). Therefore, recent stockings have been of larger fish that are more immune to predation, which appears to increase post-stocking survival (Clarkson *et al.* 1993, Arizona Game and Fish Department 1995). Monitoring studies have shown that reintroduced razorback sucker in the Verde River use pools, glides, and backwaters with some use of runs and eddies (Creaf *et al.* 1992, Hendrickson 1993).

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The habitat for razorback sucker in the Verde River has undergone major changes in the past 150 years, with the Verde Valley being the most highly modified (excluding the Horseshoe and Bartlett impoundments). The volume and pattern of flow within the river, particularly in the Verde Valley has been highly modified by water diversion, groundwater pumping, and watershed alteration. The river channel has been highly modified by removal or use of riparian vegetation, flood control, construction of diversion dams, roads and bridges, gravel mining, and agriculture and urban/suburban development of the floodplain.

In addition to habitat alterations, various nonnative aquatic species have been introduced by humans into the Verde River system and have adversely affected razorback sucker and other native fish through predation and competition (Marsh and Brooks 1989, Minckley *et al.* 1991, Ruppert *et al.* 1993, Hendrickson 1993). Nonnative species found in the Verde River include threadfin shad (*Dorosoma petenense*), rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*O. clarki*), brown trout (*Salmo trutta*), northern pike (*Esox lucius*), carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), red shiner (*Cyprinella lutrensis*), golden shiner (*Notemigonus chrysoleucus*), fathead minnow (*Pimephales promelas*), flathead catfish (*Pylodictis olivaris*), channel catfish (*Ictalurus punctatus*), black bullhead (*Ameiurus melas*), yellow bullhead (*Ameiurus natalis*), mosquitofish (*Gambusia affinis*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), walleye (*Stizostedion vitreum*), yellow perch (*Perca flavescens*), and tilapia (*Tilapia mossambica*) (Wagner 1954, USFWS 1976, Barrett *et al.* 1985, Bestgen 1986, USFWS 1988, USFWS 1989b, Hendrickson 1989, Marsh 1990, Arizona Game and Fish Department 1993, Minckley 1993, Arizona Game and Fish Department 1997). While native species form the majority of the fish community in the Verde River above Sycamore Creek (above the Verde Valley), nonnative fish now predominate downstream from Sycamore Creek. Upstream from Sycamore Creek, the Verde River is less disturbed and retains enough of its natural condition and hydrograph to prevent or delay significant displacement of the native fish community by nonnatives. The long-term trend in the native/nonnative species balance is toward more nonnatives and less natives; however, available data are too limited to determine the present rate of the trend.

The razorback sucker population in the Verde River is the most successful of the three main reintroduced Gila River basin populations of the species (Hendrickson 1993). Loss or serious impairment of this population would substantially reduce the probability of successful reestablishment of the species in the Gila River basin. Downward trends in the species in all other portions of its range and the lack of recruitment in mainstem Colorado River populations in Arizona make reintroduction efforts an important key to the survival and recovery of this species.

Section 7 Consultation Environmental Baseline in the Action Area

Fifteen formal section 7 consultations and seven informal concurrences with findings of "may affect, not likely to adversely affect" have previously been completed addressing effects of Federal actions to razorback sucker and southwestern willow flycatcher in this portion of the Verde River basin. These are summarized in Table 5.

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TABLE 5. PREVIOUS SECTION 7 CONSULTATIONS IN ACTION AREA

Project, Agency ¹	Date of Opinion or Concurrence	Species ²	Finding
FORMAL CONSULTATIONS			
Emergency Watershed Protection, Yard Property, NRCS	Dec. 27, 1993	razorback sucker & critical habitat SW willow flycatcher ²	nonjeopardy no adverse modification nonjeopardy
Central Arizona Project Nonnative Species Introduction and Spread, USBR	April 20, 1994	razorback sucker ² & critical habitat	jeopardy adverse modification
Verde Valley Ranch Development, COE	Nov. 9, 1994	razorback sucker ² & critical habitat	nonjeopardy no adverse modification
Apache Maid Allotment, USFS	Feb. 3, 1995	SW willow flycatcher ^{2,3}	nonjeopardy
Sycamore Canyon Road Stabilization, FEMA	March 29, 1995	razorback sucker & critical habitat	nonjeopardy no adverse modification
Gonzales Watershed Project, NRCS	July 27, 1995	razorback sucker & critical habitat	nonjeopardy no adverse modification
Cedar Bench Allotment, USFS	Sept. 8, 1995	razorback sucker & critical habitat	nonjeopardy no adverse modification
West Bear/Del Rio Allotments, USFS	Sept. 19, 1995 (Draft)	razorback sucker	jeopardy
Tuzigoot bridge repair, USNPS	Sept. 25, 1995	razorback sucker & critical habitat SW willow flycatcher & proposed critical habitat	nonjeopardy no adverse modification nonjeopardy no adverse modification
Eureka Ditch, NRCS	Dec. 4, 1995	razorback sucker & critical habitat	nonjeopardy no adverse modification

¹Agency abbreviations include: UBSR, Bureau of Reclamation; USFS, Forest Service; NRCS, Natural Resource Conservation Service; COE, Army Corp of Engineers; FEMA, FHWA, Federal Highway Administration; Federal Emergency Management Agency; USNPS, National Park Service; EPA, Environmental Protection Agency; ADOT, Arizona Department of Transportation; USFWS, Fish and Wildlife Service.

²Only species also in this biological opinion are listed here.

³Proposed at time of consultation.

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Verde Valley Ranch Development, COE	Feb. 23, 1996	razorback sucker & critical habitat SW willow flycatcher ² & proposed critical habitat	nonjeopardy no adverse modification jeopardy adverse modification
Skeleton Ridge/Ike's Backbone Allotments, USFS	June 25, 1997	SW willow flycatcher & proposed critical habitat	nonjeopardy no adverse modification
Verde Valley Ranch Development, EPA	Oct. 7, 1997	razorback sucker & critical habitat SW willow flycatcher ² & critical habitat	nonjeopardy no adverse modification nonjeopardy no adverse modification
Windmill Allotment, USFS	Oct. 28, 1997	razorback sucker ² & critical habitat	nonjeopardy no adverse modification
CAP Water Assignment Cottonwood Water Works/Camp Verde Water System, USBR	March 30, 1998	razorback sucker & critical habitat SW willow flycatcher & critical habitat	nonjeopardy no adverse modification nonjeopardy no adverse modification
INFORMAL CONSULTATIONS - IS NOT LIKELY TO ADVERSELY AFFECT CONCURRENCES			
Apache Maid Allotment, USFS	June 6, 1995	razorback sucker	concurrence
Emergency flood repair, Interstate 17 bridge, ADOT	Sept. 13, 1995	razorback sucker	concurrence
Brown Springs Allotment, USFS	Nov. 30, 1995	razorback sucker	concurrence
Fishery Resources Fish Stocking, USFWS	Dec. 15, 1995	razorback sucker	concurrence
Jerome wastewater treatment plan Bitter Creek, EPA	Feb. 23, 1996	SW willow flycatcher ²	concurrence concurrence
Windmill Allotment, USFS	Oct. 28, 1997	SW willow flycatcher	concurrence
Programmatic for grazing permits, USFS (number and location unknown)	1995-1998	razorback sucker SW willow flycatcher ²	programmatic concurrence without site-specific Service involvement

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EFFECTS OF THE ACTION

Effects to Southwestern Willow Flycatcher

The quality and quantity of suitable habitat for the southwestern willow flycatcher in the Verde Valley has been severely affected through numerous past actions resulting in reduction of riparian habitat, altered vegetation species composition, increased presence of cowbirds and potential predators, decreased surface water availability, changes in stream channel morphology, and other factors. A significant portion of the adverse impacts to the Verde River and its aquatic and riparian ecosystem come from the additive affect of small actions that individually may not threaten the system, but cumulatively result in a continuing deterioration of the ecosystem. The primary adverse effects from the propose bridge construction over the Verde River are the destruction of riparian habitat, and potential for additional erosion and sediment production. The proposed project will result in the permanent loss or modification of approximately less than one acre of riparian habitat on Forest Service land.

Within the Verde Valley, the river corridor is predominantly held in private ownership. The site for the proposed bridge is of special importance because it is one of very few tracts of Forest Service land in the Verde Valley which provides suitable (though unoccupied) southwestern willow flycatcher nesting habitat. Due to the imperiled status of the bird, any loss of suitable or potential habitat is viewed very seriously. The loss of even less than one acre of suitable flycatcher habitat on Federal land is of great concern. The proposed bridge site is located approximately four miles downstream from the occupied Camp Verde flycatcher site. The proximity of the nesting flycatchers to suitable habitat at the bridge site increases the probability that this habitat potentially would have become occupied at sometime in the future. However, if the site retains or re-develops the characteristics of flycatcher nesting habitat with the construction of the new bridge, the site may also become occupied at some time in the future.

The proposed bridge, though adjacent to an existing structure, will further fragment the riparian habitat along the Verde River, thus reducing habitat quality and increasing the potential for both nest predation and nest parasitism by brown-headed cowbirds. Riparian habitat in the Southwest is naturally rare and patchy, occurring as widely-separated ribbons of forest in a primarily arid landscape. In Arizona, for example, riparian habitat comprises less than 0.5 percent of the landscape (Strong and Bock 1990). The actual extent of habitat suitable for southwestern willow flycatchers is much more restricted. Wide-ranging or highly mobile species that rely on naturally patchy habitats, such as the flycatcher, persist at regional scales as metapopulations, or local breeding groups that are linked together and maintained over time through immigration and emigration (Pulliam and Dunning 1994). Persistence of local breeding groups is a function of the group's size (numbers of individuals) and the ability of individuals to disperse from one breeding location to another. Fragmentation reduces the chance of an individual successfully finding suitable habitat by isolating habitat patches. Searching for increasingly isolated patches leaves individuals vulnerable to mortality from starvation or predation and can result in loss of breeding opportunities. Habitat loss and fragmentation combine to isolate and reduce in number and size the spaces necessary for

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breeding, feeding, sheltering, and migrating. Loss and reduction of space to carry out a species' life cycle increases the probability of extinction of local breeding groups, particularly those that consist of few individuals (Pulliam and Dunning 1994). Habitat loss and fragmentation, ultimately, reduce the viability of a metapopulation or the species as a whole.

The new bridge will permanently render less than one acre of riparian habitat as unusable for flycatchers and reduce the value of adjacent habitat to an unknown degree. The new bridge will be constructed on an isolated Forest Service parcel within designated critical habitat. The riparian vegetation currently present at this site is considered to provide suitable nesting habitat for the flycatcher (though no birds have been documented on site). The removal of riparian vegetation within the project area may alter the quality of the habitat in areas adjacent to the project site.

The widening of State Route 260 will also most likely result in an increase in the speed traveled by vehicles using the highway and possibly an increase in the number of vehicles using the road. The Service anticipates that this will have the long term effect of reducing overall habitat suitability for the southwestern willow flycatcher. Foppen and Reijnen (1994) and Reijnen and Foppen (1994) documented reduced breeding success, lower breeding densities, and higher dispersal rates of willow warblers (*Phylloscopus trochilus*) breeding next to roads that bisect forested habitat. Sogge (1995a) noted that the population decline and changes in the distribution of willow flycatcher territories on the Verde River in Arizona were consistent with other studies documenting adverse effects of roads that bisect habitat. In addition, a southwestern willow flycatcher was killed by an automobile on a rural road that bisects flycatcher habitat in the White Mountains of Arizona (Sferra et al. 1995). These effects, documented in Arizona and elsewhere, indicate that habitat fragmentation caused by roads can have direct effects including mortality, and overall changes to habitat suitability that can further reduce the carrying capacity of particular habitat patches. The potential increases in vehicle speed and number of vehicles using the highway may reduce adjacent habitat suitability and increase hazards to flycatchers.

Effects to Razorback Sucker

Adverse effects of roads and road crossings on streams have been documented for many types of streams and fish species (Dobyns 1981, Meehan 1991, Megahan *et al.* 1992, Young 1994, Waters 1995). Effects include direct mortality of fish and fish eggs, direct destruction of habitat, increased sediment and changes in sediment patterns, destruction of riparian vegetation, alteration of stream channel morphology and accelerated erosion.

During construction of various human structures and facilities, drainages are frequently rerouted, channelized, or blocked. This alters the pattern by which water flows across the floodplain and enters the river. This may change (usually increase) the amount of sediment and pollutants which enter the river via these drainages. It may also accelerate or retard the rate with which the water flows into the river thus altering channel morphology and the availability and distribution of aquatic habitats. If drainage elevations are changed, erosion is likely to occur, with consequent erosion of riverbanks of the Verde River itself and increased sediment loading in the Verde River. Roads,

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buildings, parking lots, and other areas of impermeable surfaces change the rate and pattern in which precipitation moves through the watershed. Flood volumes become higher and flood duration shortens, while the volume of low flows decreases and their duration increases (Leopold *et al.*, 1964). Sediment movement patterns are also changed. The reduction or loss of vegetation on large portions of the watershed and floodplain increases sheet erosion and decreases uptake of precipitation.

These changes to the floodplain, watershed, and hydrologic and sediment regimes affect razorback sucker habitat in many ways. While razorback sucker are not inordinately sensitive to moderate amounts of sediment, excess sediment fills the pool habitat favored by adult razorback sucker and the shallow backwater habitats needed by larval and juvenile razorback sucker. Excess sediment may also bury gravel habitats needed by razorback sucker for spawning and reduce the reproductive success of the species. Increased flood volumes alter the river channel in many ways, some of which may decrease razorback sucker habitat. As the river channel readjusts to the changing hydrologic regime, erosion occurs and bank instability increases. Some of the characteristics already exhibited on the Verde River that are indicative of channel instability and excess sediment are large areas of wide, shallow, sometimes braided flow, eroded banks, and loss of backwater habitats. These areas have, at best, limited habitat for all life stages of razorback sucker.

Bridges function as an obstruction or constriction of the stream channel, thus resulting in channelization. Channelization has many adverse effects to razorback sucker, including direct habitat reduction by shortening of the river channel, loss of backwater larval and juvenile habitats, increased velocities, disruption of food base, and many others. The design of the SR 260 bridge minimizes but does not eliminate channelization effects.

Effects to razorback sucker from infrastructure construction and operation would occur as an indirect result of watershed alteration. This may take the form of increased erosion, increased sediment reaching the river, and increased pollutants in runoff. It would also occur through increased soil compaction, accompanying decreased infiltration, and resulting changes in the hydrologic regime including increased flashiness of flooding. These effects are expected to have long-term adverse impacts to the habitat of razorback sucker within the Verde Valley and possibly downstream. Given that expected mitigation and that the amount of infrastructure required for the proposed action is relatively small, the effects to the river channel and razorback sucker and its critical habitat are expected to be minor.

During road and bridge construction the potential exists for introduction of toxic substances, such as petroleum products, into the river. If this occurs, direct mortality of razorback sucker and its eggs may occur. The project minimizes, but does not eliminate, this potential.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that

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are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of ESA. The BA for this project includes a long-term management plan designed to provide a forum for discussion and introduction to interested and involved parties for any future proposed projects in the action area. The Service knows of no specific future State, local or private proposed projects in this project area.

As stated in the BA, human population growth is expected to occur in the town of Camp Verde at a rate of 2.63% yearly. Increased growth will lead to increased development, increased visitation and recreation (including fishing, boating otherwise water-related activities), increased contamination, increased wildfires, and increased alteration of the watershed and hydrologic regime.

Increasing development along the Verde River may have significant effects on the southwestern willow flycatcher. Effects may be direct on individuals or on habitat. Construction in the 100-year floodplain could destroy or adversely modify habitat. Habitat fragmentation can have direct effects including mortality and overall changes in habitat suitability that can further reduce the carrying capacity of a particular habitat patch. Increased development also has a secondary effect of increasing predatory pets. Increases or changes in the types of potential cowbird foraging sites (i.e. bird feeders, golf courses, corrals, stockyards) may increase the potential for cowbird parasitism of local flycatchers. Increased human disturbance including recreational use of the river floodplains, particularly by off-highway vehicles or river floaters, may also adversely affect habitat.

SUMMARY

The combined effects likely have a considerable influence the aquatic and riparian habitats of the Verde River. Habitat loss, modification, and fragmentation are the primary factors involved in the decline of the southwestern willow flycatcher (USFWS 1993, 1995) and are the primary threats to the survival and recovery of this species. A total of 587 territories are known rangewide (Table 3) and more than 75% of flycatcher sites are made up of an estimated five or fewer territories. Habitat loss and modifications that allow non-native fish species to flourish are the primary factors for decline of razorback suckers.

CONCLUSION

After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the project as described is not likely to jeopardize the continued existence of the southwestern willow flycatcher or razorback sucker and is not likely to adversely modify the critical habitats of southwestern willow flycatcher or razorback sucker.

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INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided such taking is in compliance with the terms and conditions of this incidental take statement. The measures described below are nondiscretionary, and must be undertaken by the agency or made a binding condition of any grant or permit issued to the applicant, as appropriate.

ANTICIPATED LEVEL OF TAKE

If, during the course of the project, the amount or extent of anticipated incidental take is exceeded, FHWA should immediately reinstate consultation with the Service to avoid violation of section 9. Operations must cease immediately in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). FHWA will immediately provide a detailed explanation of the causes of the additional taking to the Service. FHWA works with ADOT for project implementation, and ADOT is involved in the project on the ground.

Southwestern Willow Flycatcher Anticipated Incidental Take

The Service anticipates that incidental take of the southwestern willow flycatcher could occur as a result of the proposed bridge construction as part of the State Route 260, Cottonwood to Camp Verde project. Though flycatchers have not been documented at the site, suitable habitat exists, and flycatchers could occupy the site during the construction phase or after project completion given the proximity of this site to other occupied nesting habitat. Potential sources of take in the form of harm, injury, or death include the loss of a nesting site, loss or disturbance of a nest, loss or modification of adjacent habitat that could accommodate population expansion, nest parasitism by cowbirds anticipated in the long-term, and collision with vehicles. The proposed action will result in some riparian habitat degradation and loss, and potentially reduce nesting productivity if/when the site is occupied by nesting flycatchers. Habitat loss and degradation is anticipated to result in displacement of adults, reduced productivity, and reduced survivorship of adults and young in the long-term.

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The extent of take for this proposed action is difficult to measure due to a high level of uncertainty about project effects and difficulties in detectability of taken flycatchers. No surrogate measures for take have been identified. The Service concludes that incidental take from the proposed action will be considered to be exceeded if the proposed action is not implemented as planned and outlined in this document.

Razorback Sucker Anticipated Incidental Take

The Service anticipates that the proposed action will result in incidental take of razorback sucker through direct mortality and through indirect mortality resulting from habitat loss or alteration. Adult, larval, or juvenile razorback or eggs may be killed if toxic materials are accidentally introduced with the water or may be smothered by excess sediment. Indirect take may occur as a result of low flow depletion, changes in river channel morphology and hydrologic regime due to watershed alteration by development, or through increased input of sediment and pollutants. Indirect take will not occur immediately, but will occur gradually with habitat alteration.

The anticipated level of incidental take of razorback sucker cannot be directly quantified due to the lack of information on the razorback sucker population in the area, and the time lag inherent in effects to hydrologic patterns and channel geomorphology. Greater than anticipated incidental take will be considered to occur if: 1) the proposed action is not implemented as planned, 2) more than 20 dead fish per event, of any species, are found within 0.5 miles of the construction area, and 3) any spill of toxic materials occurs in the Verde River or its floodplain during, and as a result of, the proposed project activities.

EFFECT OF INCIDENTAL TAKE

In the accompanying biological opinion, the Service has determined this level of anticipated take is not likely to result in jeopardy to the southwestern willow flycatcher or razorback sucker nor nor adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking of razorback sucker and southwestern willow flycatcher authorized by this biological opinion. The reasonable and prudent measures (RPM) described below are non-discretionary, and must be implemented by FHWA so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If FHWA (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight or ensure compliance with these terms and conditions, the protective coverage of sections 7(o)(2) may lapse.

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Some of the reasonable and prudent measures and their implementing terms and conditions are already an implicit or explicit part of the proposed project and their inclusion in this incidental take statement is only an affirmation of their importance of minimizing take. Where the proposed project already adequately fulfills the following reasonable and prudent measures and terms and conditions, this incidental take statement does not imply any requirement for additional measures.

- 6) FHWA shall conduct all proposed actions in a manner which will minimize direct mortality of razorback sucker. (No direct mortality of southwestern willow flycatcher is anticipated or authorized.)
- 2) FHWA shall conduct all proposed actions in a manner that will minimize loss and alteration of razorback sucker and southwestern willow flycatcher habitat.
- 3) FHWA shall maintain complete and accurate records of actions which may result in take of razorback sucker and southwestern willow flycatcher.
- 4) FHWA shall protect and enhance southwestern willow flycatcher habitat on the Verde River.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of ESA, FHWA must comply with the following terms and conditions (T&C), which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

The following term and condition is necessary to implement reasonable and prudent measure 1:

- 1a) No construction equipment will enter the live stream.
- 1b) No water will be withdrawn from the Verde River.
- 1c) During the February 1 to May 31 razorback sucker breeding period, no falsework will be permitted in any portion of the riverbed. Use of any heavy equipment in the riverbed will be restricted to the minimum possible.

The following term and condition is necessary to implement reasonable and prudent measure 2:

- 2a) FHWA, ADOT, and their construction contractor will use best management practices and use technical advice and biological information on ways to minimize adverse effects to razorback sucker and southwestern willow flycatcher habitat (e.g., protection against toxic spills, reduction of sedimentation, minimizing loss of riparian vegetation).

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- 2b) FHWA will ensure that the mitigation measures included in the project description are fully implemented.

The following term and condition is necessary to implement reasonable and prudent measure 3:

- 3a) FHWA shall submit an annual report to the Service each year through completion of activities related to construction within and immediately adjacent to the river corridor. This report shall include monitoring results for both the razorback sucker and southwestern willow flycatcher, a description and explanation of any project mitigation measures which were not implemented or which had a result not otherwise expected, and complete and accurate records of any incidental take that occurred during the course of the project.
- 3b) The Service shall be notified immediately (602/640-2720; 602/640-2720 FAX) if more than 20 dead fish are detected during any one event within 0.5 mile upstream and 0.5 mile downstream of construction activities. Any construction actions that may be contributing to the introduction of toxic materials or other causes of fish mortalities must be immediately stopped while the Service is contacted and until the Service agrees the situation is remedied. If upstream monitoring from the construction site demonstrates that the source of dead fish is not related to construction actions, the Service is to be notified, but construction may proceed.

The following term and condition is necessary to implement reasonable and prudent measure 4:

- 4a) FHWA and ADOT will determine the ownership of the property downstream of the I-17 bridge along the Verde River on which ten flycatcher pairs successfully nested during 1997 and seven pairs in 1998. Once this information is obtained, several options will be considered to protect and/or acquire this property, including the possibility of arranging a land exchange between the property owner and the Forest Service. All parties will extend every reasonable effort in order to successfully complete this action.
- 4b) FHWA will ensure all lands they may acquire for the benefit of southwestern willow flycatcher in the Camp Verde area will be protected and managed for the maximum benefit to the flycatcher.
- 4c) Once construction is completed, FHWA will enhance southwestern willow flycatcher habitat through cottonwood and willow pole plantings adjacent to the bridge construction sites.
- 4d) FHWA and ADOT will provide funding for certain flycatcher research projects to the maximum funding level of \$200,000.
- 4d1) A two-year continuation of the ongoing southwestern willow flycatcher nest monitoring study at Camp Verde, AZ, will be completed. The ongoing study has

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been conducted by SWCA, Inc. in conjunction with requirements of the Verde Valley Ranch Biological Opinion (July 1996). Continuation of this project for the next two years (1999 and 2000) will include the following: behavior monitoring (foraging, singing, time and activity budgets), nest monitoring, insect collection and identification (results of this will be used in conjunction with a fecal diet analysis study being funded separately), vegetation volume measurements, data entry, statistical analysis, and draft and final report. Provide for consistency in research methodologies for this long-term study. Data summaries will be provided to the Service and AGFD by December 1 of each year. The draft report will be provided for Service review and comment by April 2001, and final report completed by July 1, 2001.

- 4d2) A physiological condition/health study of southwestern willow flycatchers in AZ will be completed for 1999 and 2000. The purpose of the study will be to collect blood samples to compare the physiological condition/health of flycatchers in native vegetation versus in tamarisk dominated habitats. The U.S. Geological Survey, Biological Resources Division, Colorado Plateau Field Station at Northern Arizona University is permitted to conduct this type of sensitive work (e.g., drawing blood) and has developed the study design. Data summaries will be provided to the Service as part of the annual permit reporting process. The draft report will be provided for Service review and comment by April 2001, and final report completed by July 1, 2001.
- 4e) Southwestern willow flycatcher surveys, following accepted survey protocol, will be conducted along the Verde River within 0.5 mile upstream and 0.5 mile downstream of the proposed bridge during the breeding season immediately prior to construction. If southwestern willow flycatchers are present, there will be no construction activities in the riparian zone within 0.25 mile of the nest site. Within 0.25 mile of the nest site in non-riparian areas (e.g., roadway approaches), construction activities which would not result in additional disturbance to the birds over that of the existing road may proceed. Activities such as blasting and pile driving would be precluded. These restrictions would be in place for the April 15 to September 15 breeding season. If the three-stage preconstruction survey indicates that flycatchers are not present, the contractor will be permitted to start work in riparian habitats and in the Verde River upon completion of those surveys, on or about July 1.
- 4f) Construction activities in the streambed of the Verde River will be restricted to the period of September 15 to January 30 (noting the exception outlined in Term and Condition 4e), which would follow the flycatcher breeding season and precede the main razorback sucker breeding season of February 1 to May 31.

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DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon locating a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, 26 North McDonald, Suite 105, Mesa, Arizona, 85201, phone number 602/835-1957, within three working days of its finding. The Service can advise as to handling of dead or injured listed species. Written notification must be made within five calendar days and include the time, date, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

If feasible, the Service will ensure that the remains of intact specimens of listed animal species to be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action.

To the extent this statement concludes take of any threatened or endangered species of migratory bird that will result from the agency action for which consultation is being made, the Service will not refer the incidental take of any such migratory bird for prosecution under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703-712), or the Bald Eagle Protection Act (BEPA) of 1940, as amended (16 U.S.C. 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the action(s) outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service believes FHWA, ADOT, and other involved parties have displayed great adaptability and cooperation to ensure both the success of the project and protection for listed species. We

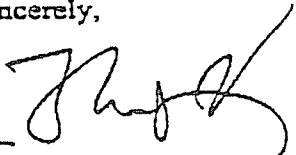
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appreciate the open communication and collaboration by all involved, and look forward to future, successful, positive projects.

Please refer to consultation number 2-21-98-F-403 in future correspondence concerning this project, and contact Bruce Palmer (x237) or me with any questions or concerns at the Phoenix Ecological Services office at (602)640-2720.

Sincerely,

for 
David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GARD-AZ/NM)
Field Supervisor, Fish and Wildlife Service, Albuquerque, NM
Project Leader, Fish and Wildlife Service, Pinetop, AZ

Director, Arizona Game and Fish Department, Phoenix, AZ

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